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ABSTRACT

In the High/Scope Cognitively Oriented Curriculum, teachers create an environment in which students develop and apply cognitive capacities in the areas of classification, seriation, spatial and temporal relations and in the process of representation to the widest ranges of materials and subjects. Learning takes place through the child's manipulation and experimentation with objects and through his experiences with the cognitive goal areas incorporated into his activities by the teacher. The observation procedure used is SCOPE (Systematic Classroom Observation of Pupil Experience) and consists of six broad categories: (1) child-adult contacts, (2) child-child contacts, (3) child-material contacts involving reading or writing, (4) child-material contacts not involving reading or writing, (5) lone, and (6) group size. A separate instrument for coding teacher behavior, SCOTE, was also created. Since classroom behaviors are directly relevant to curriculum goals, observational data can be used for assessing success in meeting those goals. The intensive data on individual children may serve a useful formative function since a profile of the interaction patterns of the children can be provided to the teacher. (Author/RC)

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ASSESSMENT USING AN OBSERVATION PROCEDURE IN THE COGNITIVELY ORIENTED CURRICULUM

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The High/Scope Foundation is in its third year of collecting classroom observation data as part of the evaluation of our Follow Through model. Over the years, the curriculum has been in the process of evolving, and our observation procedures have likewise changed. Part of this change has resulted from the natural sorts of modifications that we all make as we see results that are less interpretable than we had expected, categories that are less reliable than we had hoped and definitions that seem inadequate in retrospect. But changes have also occurred in our views as to how we can best use the observational data. In this paper I would like to share some of our experiences with you, try to explain why we view observations the way we do, and give some illustrative findings from the spring data collection we have just completed. I would also like to present some data we have that bears on some of the important methodological issues in observational research.

The High/Scope Cognitively Oriented Curriculum

To set the stage, I should briefly summarize the nature of the curriculum that High/Scope sponsors in Follow Through. In the High/Scope Cognitively Oriented Curriculum teachers create an environment in which children develop and apply cognitive capacities in the areas of Classification, Seriation, Spatial and Temporal relations and in the process of representation to the widest possible ranges of materials and subjects.

To accomplish this, teachers arrange the room by stocking it with materials that can be actively manipulated to produce finished products and ongoing processes with which children can identify. These materials typically include art and construction materials, games, musical instruments, books and magazines, typewriters, old clothes and costumes, ingredients for cooking and experimenting. Children have access to the outside. The material is arranged so that related material is stored in well defined locations and is readily accessible to children. Furniture allows and suggests projects and active work by providing work space and storage for uncompleted work.

Teachers establish a schedule for activity that brings children into contact with the materials in the room and nurtures increasingly complex experiences in which children actively manipulate materials to produce products which include performances, constructions, art works and completions of self-set tasks. The schedule provides for representation of experiences through planning, preparing and organizing before activities are undertaken and representing experiences after they happen through linguistic and other means of representation. Before children begin work they are asked to dictate or write a plan for what they are going to do that day or for the next several days. Children then work to carry out their plans. After a period of work, children represent their experiences by dictating or writing stories about what they have done and represent what they have done through pictures, diagrams, charades, models and verbal descriptions. Teachers plan and carry out small group activities designed to introduce new materials and concepts. Large group meetings are scheduled for performances, stories and field trips.

Teachers interact with children to exploit the potential of materials and activities children have selected. Children are encouraged to experience and verbalize concepts and relationships in the planning or production of processes and products.

The child's role is one of active participation. His learning takes place through his manipulation and experimentation with objects and through his experiences with the cognitive goal areas that teachers incorporate into his activities. It is through this active involvement by both teacher and child that children's thinking, communication and academic skills are strengthened.

When it came to evaluating our program based on this curriculum in several field sites, we felt a need to go beyond the traditicnal outcome measures. For one thing these measures did not appear to be sensitive to the changes that we felt were taking place. Our staff could see things happening in the classrooms that somehow were not being reflected in test scores. In large part, the goals of the curriculum specify a process of development that is seen in children's daily behavior. If we could systematically record what children were doing, the description of the classroom process would, in itself, provide us with evidence of the program's effectiveness.

At first we viewed observations as a way of assessing how well the curriculum was being implemented. Our perspective has now changed so that the classroom process is viewed, in part, as a program outcome, or at least an important facet of the total outcome picture. Before discussing this point of view more fully, let me back up and review how we arrived at our current position.

Past Classroom Observation Research

When High/Scope first began classroom observation research we used systems that had already been developed. In our Curriculum Demonstration Project in the mid-sixties, the OScAR (Seifert, 1969), and the PROSE (Sheriff, 1971) were used (supplemented by a couple of our own procedures). We subsequently used the PROSE in a study of program implementation in our Planned Variation Head Start sites (Deloria, Dick, Hanvey and Love, 1972). The PROSE (developed by Medley, Quirk, Schluck and Ames, 1971, at ETS)is a very useful all-purpose observation instrument, using a time-sampling procedure. We got decent reliability with it and its categories picked up differences and similarities between programs that made sense to us. But we were dissatisfied because it seemed that we should be able to say even more about our classrooms. This led us to define behavior categories (for both teacher and child) that were more specifically expected in classrooms where the Cognitively Oriented Curriculum was being implemented. We began to realize that observation systems cannot be value-free. Every definition represents a way of conceptualizing the process one is trying to assess. Even though all observation systems might meet the criterion of having categories of behavior operationally defined, the selection of behaviors to observe reflects (and should reflect, in our view) the theoretical biases of those constructing the system.

As everyone on this panel knows, it is no easy matter to define precisely the behaviors you are interested in and to train several observers to code the behaviors reliably. Thus, the first system we developed to our own specifications was soon to be revised. Nevertheless, last year we were able to learn some very important things about doing classroom observations and to demonstrate some of the things others have been talking about.[1]

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[1]The findings from the 1972-73 classroom observation study are detailed in the Follow Through Progress Report submitted by High/Scope to the Office of Education (Morris and Love, 1973).

Methodological findings. One thing we learned was that there is no such thing as the index of observer agreement, at least for our observation instrument. Last year there were three observers and a trainer conducting observations at two grade levels at four sites in the fall and in the spring. We found differences in observer-trainer agreement across observers, within observer across sites, and within sites across time. Since our feeling is that unreliable data should not be analyzed, having different subsets of analyzable data for different sites and time points greatly complicates the analysis.

Another thing we learned about the methodology of classroom observation was that the classroom behavior patterns of teacher and children were relatively stable across days. Each classroom had been observed for two mornings and two afternoons. When the first morning and afternoon were combined and compared (by a chi square analysis) with the second morning and afternoon, the two days looked very similar for six of the seven randomly selected classrooms. In two classes there was a significant day-to-day difference on only one of the categories; four classrooms differed from day to day on only two to four of the 66 categories on the instrument. Keep in mind that this stability occurred with a procedure in which all children in the classroom were observed in a random sequence for short periods of time. We have other data which suggest that when the observer focuses on a small number of children and observes different children on different days, there will be greater variation in the "picture" of the classroom from day to day.

Classroom interaction findings. Last year we collected preliminary data comparing Follow Through and non-Follow Through classrooms in one of our sites. We found several important differences between the two sets of classrooms that seemed to support observation procedures as a way of describing what was happening in the classroom. In the third grade Follow Through classrooms children initiated interactions with adults more frequently, received more individual attention from adults, were more often drawing or creating picture materials, and were more often in small groups. During child-child interactions, Follow Through children were more likely than non-Follow Through children to be using materials. In interactions with adults, the adults in the Follow Through classes were more likely to be listening to or watching the children rather than "lecturing." Similar results were obtained at the first grade level. These findings came from one site where we had control data. During 1973-74 we have collected Follow Through and non-Follow Through data in three different locations.

Focus on Children

In the data we have collected this year, we shifted the focus of our observations from the classroom to the child. One basic reason for this is our general concern with finding improved procedures for assessing the growth and development of children as they progress through the curriculum. Observation offers a method for assessment that should tell us what children are actually doing as they work with materials, and as they interact with their peers and their teachers. (A secondary reason for focusing on children is that I have always found it hard to understand the meaning of a "classroom" behaving with a certain frequency; when the data are a composite of short time periods from all children in a random sequence, the unit of analysis becomes pretty abstract.)

To focus on individual children, we decided to observe each child for one-half day. This was accomplished by selecting two children per day and alternating from child to child every ten minutes throughout the day (if the daily routine were the same in the morning and afternoon, however, the simpler procedure of observing one child in the morning and the other in the afternoon was followed). On separate days, the teacher was the focus of the observations. We collected two full days of observations on each teacher in this study. Six children were randomly selected from both a second and a third grade classroom from three of our Follow Through centers and from three non-Follow Through schools in the same sites. Even with this small sample, data collection took four weeks at each site. Since this study was designed to be an intensive look at a small but carefully selected sample, High/Scope curriculum staff selected the "best" second and third grade classes in each of these centers.

The observation procedure is a time sampling category system. The observations are made during a two-second interval, signalled at the beginning and end by a tone recorded on a cassette tape and played through an earphone worn by the observer. These two-second observing intervals occurred every 20 seconds so that approximately 18 seconds between observations was available for marking the coding sheet and watching the child in preparation for the next observing interval. No observations were made during lunch, rest time, library time, or during lessons or activities that were not conducted by the regular classroom personnel.

The system for observing children is called SCOPE (Systematic Classroom Observation of Pupil Experience). It consists of six broad categories, each containing several mutually exclusive subcategories or items which define the type of event that is to be coded. The categories[1] can be briefly summarized as follows:

1. Child-adult contacts. Items in Category 1 are coded when the observed child is paying attention to an adult during the observation interval. The observer can code items indicating that the teacher and child are engaged together in an activity (and if so, who is talking), that there is verbal interaction but no activity, or that the child is passively listening to and/or watching, or that the child is aggressive.

2. Child-child contacts. When the target child is paying attention to another child, the nature of the interaction is coded on a cooperative-uncooperative basis (cooperation meaning a joint venture that may require division of labor).

3. Child-material contacts involving reading or writing. Six items can be coded here, depending on whether the reading or writing is of the child's own story, a peer's story, or of a story from some other source.

4. Child-material contacts not involving reading or writing. Some materials (such as a puzzle) are highly likely to structure the child's activity; other materials allow more creativity or exploration. The items in this category code the child's behavior as manipulating, looking, or not using materials that either structure the activity or do not structure it. Additional items permit coding children looking at materials that are not being used, fidgeting with materials, or using materials destructively.

5. Lone. Category 5 was created for coding the child who is not interacting with anyone or anything, and was coded only if categories 1 - 4 were not coded.

6. Group size. The size of the group the target child is in when an adult is present can be specified in five items--sizes of one, two, 3-5, 6-10, and 11+.

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[1] A coding manual with definitions, examples, and instructions may be obtained from the High/Scope Foundation.

Our analyses of the data collected in February and March are just beginning, but I would like to describe the two ways we are dealing with the observational data. One method is to calculate the Goodman's (1965) confidence interval for the items in each category. For this analysis the population of interest is conceptualized as all possible behaviors that a child may emit (see Chasson, 1961). The time sampling procedure thus yields a random sample of the population behaviors.

The confidence interval concept is that for some sample statistic given some probability level, say .99, it is possible to define a range of values for which the probability is .99 that the actual population parameter is contained within that range. Conversely, the probability is .01 that the actual population parameter is not contained in the interval. For these observational data this means that if a child were observed for one day and was recorded as performing some behavior for 20% of those observations it is possible to calculate a range of percentages and make probability statements about that range, such as: there is only one chance out of 100 that this child's actual percentage of the observed behavior is greater then the upper bound or less than the lower bound. When comparing two children on the same behavior it is possible to make probability statements based on the pair of confidence intervals calculated for the children. If they do not overlap, then the probability that the population parameters are equal is not greater than the probability that neither of the confidence intervals contain the population parameter. This joint probability is the product of the individual probabilities or .99 x .99 which equals .9801. Therefore when confidence intervals do not overlap the probability that the population parameters for the pair of children are equal is less than 1 - .9801 or less than .02.

The confidence band for the proportion that each item is of the total category frequency can be graphed. Then the significant differences between items within a child and between children on a particular item can be determined simply by noting which confidence bands do not overlap. Figures 1 and 2 illustrate this procedure for two third grade children from one of our Follow Through centers. Category 1 (Child-adult contact) shows both within-child and between-child differences. For Child B, there are two significant differences--Item 5 has a higher frequency than either Item 1 or 2. For Child A, the only difference is that Item 4 (passive listening and watching) occurred significantly more often than Item 2 (talking to an adult). Similar kinds of comparisons can be made between children.

It appears that the only difference between the two children on Category 1 is on Item 5--Child B spent more time watching the observer. On Category 2 (Child-child interactions, the two children differ on Items 1 and 2. In addition to obtaining the reliable differences by examining the confidence bands, we can look at the actual proportions and make decisions about the meaningfulness of the differences. The fact that this analysis results in some easily interpretable graphic representations suggests that this might also be a nice way of providing feedback to teachers.

The second way in which we are treating these data is to give each child a "score" which is his frequency for each of the items. SCOPE would thus be seen as analagous to a test with six scales and several items per scale. With this perspective, the typical inferential statistics can be applied. There are then, however, two methodological problems that have to be dealt with. One is the violation of the assumption of independent observations since the children being observed are interacting within the same classroom with the same teacher. There does not appear to be a solution to this problem, but since it results in understating the true differences in any t or F tests, I would not be so concerned with this problem. The more serious problem is that the dependencies among the observational categories result in nonindependent tests of significance if one were to do, say, an F test for group differences on each of the items in the observation system. The simplest procedure might be to simply adjust the alpha level in all the tests of significance so that "too many" significant differences are not found. Other procedures such as multivariate analysis of variance or multiple linear regression might extract more information from the data, however.

Although I can't report any findings from these procedures yet, I want to mention an interesting finding from our data preparations. Since each child is not observed for an equal amount of time, each child has a different total number of events coded. To adjust for this, we took as each child's score the proportion that each item frequency was of the total number of events. As others have pointed out, this results in highly-skewed, J-shaped distributions for each variable, in which the means and standard deviations are correlated. We found, in fact, that for the 36 SCOPE variables the correlation between the means and standard deviations was .85. The standard recommendation is to apply an arcsine transformation to the proportions. However, when there are a large number of categories so that the proportions in all categories are very small, the arcsine transformation has practically no effect upon the shape of the distributions, and for our data the correlation between the

means and standard deviations of the transformed data increased to .89. When we applied a cube root transformation many of the distributions became fairly normal and the correlation went down to .20.

Focus On Teachers

In addition to observing children, we created a separate observation instrument for coding teacher behavior, the Systematic Classroom Observation of Teacher Experience (SCOTE). SCOTE consists of eight categories, each containing several items which are mutually exclusive within categories. The items in the eight categories record:

1. Verbal behavior of the teacher in terms of type of question asked, etc.;

2. Whether or not the verbal behavior is related to the material the child may be using;

3. Whether or not the teacher is responding to a child's verbalization;

4. The teacher's nonverbal behavior, such as being engaged in an activity with the child or watching the child;

5. The type of materials the teacher is using when she is doing things with a child;

6. Whether or not the teacher interacted with a child on a one-to-one basis or as a member of a group;

7. Number of children in the teacher's group or the number of children she is focusing on in the interest centers;

8. Whether or not the teacher is interacting with the same child or group that she had interacted with during the previous observation interval.

The teacher observations lend themselves to the same kinds of analyses as the child data. In addition, having teacher data collected on different days than the child data permits correlations between teacher and child variables that are more reflective of the true relationship between teacher and child. If both sets of observations were made simultaneously, correlations might be attributed to idiosyncratic interaction patterns occurring that day.

Multiple linear regression methods will be used to explore the extent to which the various teacher variables predict child behavior in the classroom. Our findings will be included in our Follow Through year-end report to be published later this summer.

Conclusions

The analysis of classroom interaction is a complex enterprise. We have elected to focus on individual children and their teachers. Since classroom behaviors are directly relevant to curriculum goals, observational data can be used for assessing our success in meeting those goals. In addition, the intensive data on individual children may serve a useful formative function since a profile of the interaction patterns of the children can be provided to the teacher.

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FIGURE 1

GOODMAN'S CONFIDENCE INTERVALS FOR CLASSROOM INTERACTION VARIABLES: CHILD A

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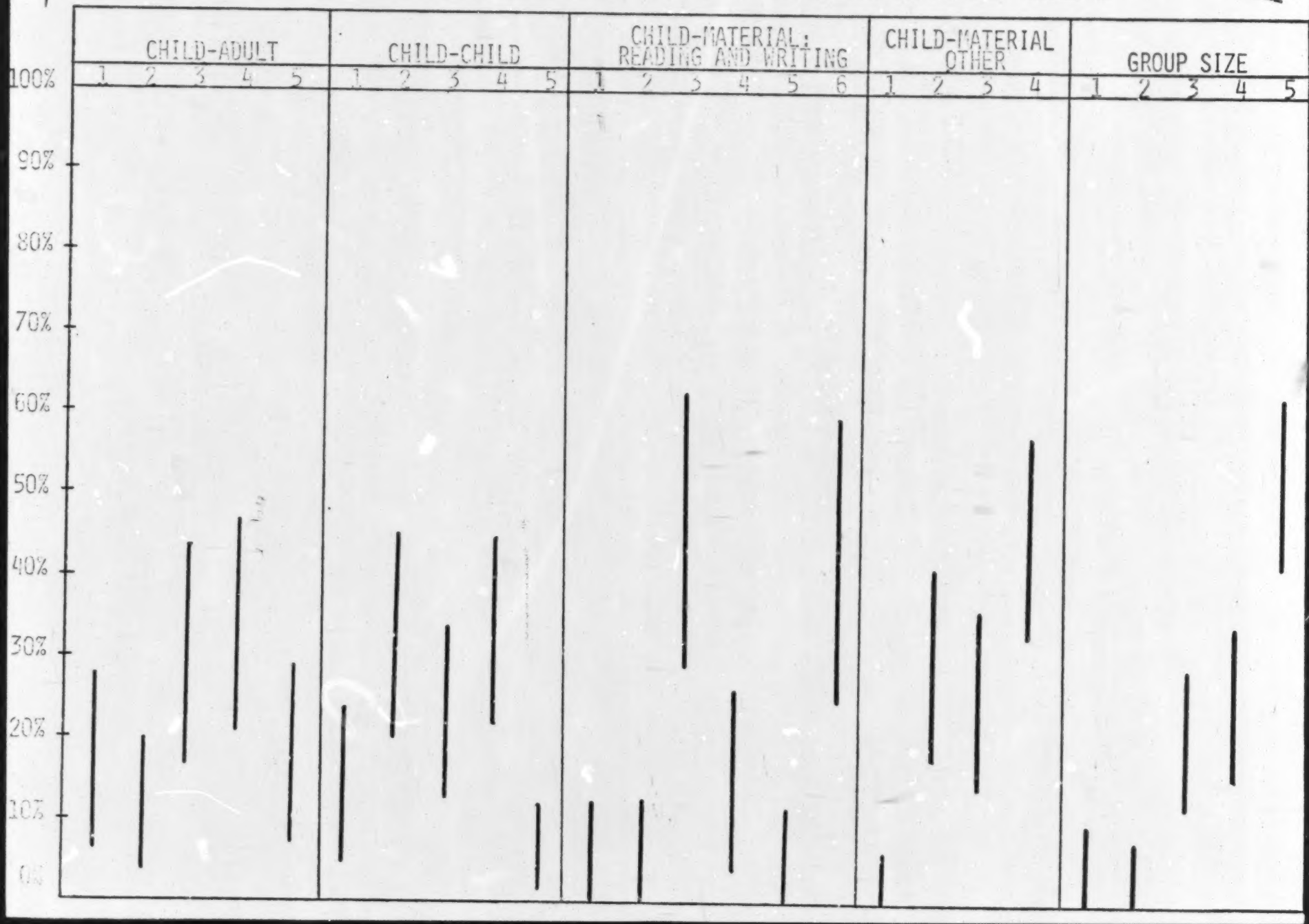

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FIGURE 2

GOODMAN'S CONFIDENCE INTERVALS FOR CLASSROOM INTERACTION VARIABLES: CHILD B